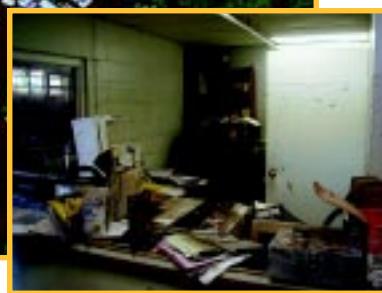


Section 3



Anthony Mangeri, NJOEM



Eryn Robinson, Dewberry & Davis

Hurricane Floyd destroyed, damaged, or otherwise affected at least 4,315 businesses in the State of New Jersey. The most significant damage occurred in a handful of small communities. Since a vast majority of businesses throughout the State were operating at normal levels within a short period of time following the disaster, and the State's economy was strong before the disaster with low unemployment and accelerating employment growth, this flooding is not likely to have a significantly adverse effect on the State's economy over the next 5 to 10 years. The State of New Jersey is working with municipalities to coordinate State and local mitigation plans and determine multi-hazard mitigation strategies that are most appropriate for each community.

3.1 Pre-Disaster Conditions

3.1.1 Primary Industries and Employment

In 1997, the New Jersey Gross State Product (GSP) was \$294 billion and per capita income was \$32,356. The New Jersey economy has enjoyed a rate of growth close to the national average over the past 10 years, while the rate of population growth in New Jersey was estimated

to be half the national average from 1990 to 1998. While New Jersey's rate of economic growth was slightly less than that of the nation's between 1996 and 1997, it was comparable to other states in the Mid-Atlantic region. During this period, the economic sectors with the largest contribution to New Jersey's economy included:

- Wholesale and retail trade;
- Finance, Insurance, and Real Estate (FIRE); and
- Services.

Trends in revenue generation show that New Jersey has experienced substantial growth in the Services and Finance, Insurance, and Real Estate sectors between 1977 and 1997. As percentages of GSP, these sectors increased by 8.2 percent and 6.6 percent, respectively, during this period. The greatest loss was in the manufacturing sector, which declined as a percentage of GSP from 26.5 percent to 14.0 percent.

Employment grew substantially from 1993 to 1998, resulting in an unemployment level that is currently only slightly higher than the national average. Specifically, New Jersey's unemployment level has declined annually from a 1993 high of 8.4 percent to 4.2 percent in 1997. During this time, the U.S. unemployment rate dropped from 7.2 percent to 3.6 percent. State and national unemployment levels slowly increased to 4.6 percent and 4.5 percent in 1998, respectively.

Table 3-1 shows the annual average number of employees and total weekly average wages by industry. In addition, Table 3-1 lists the percentage of the State's total employment that each industry represents. Table 3-2 shows the 20 largest businesses in New Jersey, listed by number of employees.

According to a 1998 report prepared by the New Jersey Department of Labor (*Projections 2006: New Jersey Employment and Population in the 21st Century*), employment growth from 1996 to 2006 in New Jersey is anticipated to increase at a faster rate than in the previous 10 years. The services sector is expected to account for the majority of employment growth in the State. Gains in construction employment will fail to offset losses in manufacturing, creating a net loss in goods-producing industries. Population growth rates for the State are also projected to accelerate, but the labor force is anticipated to grow faster than the population at large.

State of New Jersey

Table 3-1 Number of Employees, Total Payroll, and Average Annual Salary by Industry and the Industry Percentage of Total Employment in New Jersey (1996)

Industry Sector	Number of Employees	Annual Payroll [\$1,000]	Avg. Annual Salary [\$]	Percent of State's Employment
Services	1,121,867	34,347,402	30,616	35.0
Retail Trade	587,782	10,747,759	18,285	18.3
Manufacturing	539,790	23,498,161	43,532	16.8
Wholesale Trade	305,704	13,336,160	43,624	9.5
Transportation and Public Utilities	259,068	10,427,341	40,249	8.1
FIRE	251,735	11,720,102	46,557	7.8
Construction	122,637	4,794,780	39,097	3.8
Agriculture	16,203	407,252	25,134	0.5
Mining	3,114	198,144	63,630	< 0.1
Unclassified	901	20,804	23,090	< 0.1
Total	3,208,801	109,498,905	N/A	100

Source: U.S. Bureau of the Census

Table 3-2 1998 Top 20 Employers in New Jersey

Company	Industry Sector	Number of New Jersey Employees
AT&T	Transportation and Utilities	28,342
Lucent Technologies, Inc	Transportation and Utilities	18,000
Bell Atlantic	Transportation and Utilities	17,800
Johnson & Johnson	Services	11,000
Public Service Enterprise Group	Transportation and Utilities	10,400
Merrill Lynch & Co, Inc.	FIRE	10,264
Federated Department Stores	Retail Trade	10,200
Trump Hotels and Casino Resort	Services	10,100
Merck & Co, Inc.	Manufacturing	9,300
Continental Airlines	Transportation and Utilities	8,734
Genesis Health Ventures	Services	8,083
Summit Bancorp	FIRE	7,216
Bristol-Myers Squibb Co.	Manufacturing	7,000
Home Depot, Inc.	Retail Trade	7,000
Lockheed Martin, Corp.	Manufacturing	6,550
Lechters, Inc.	Retail Trade	6,311
Kmart Corp.	Retail Trade	6,000
Wal-Mart Stores Inc.	Retail Trade	5,770
Sears Roebuck & Co.	Retail Trade	5,730
Warner-Lambert Co.	Pharmaceutical	5,450

Source: New Jersey Business Resource Center, 1999

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3.1.2 Tax Structure

The New Jersey Division of Taxation and local tax assessors administer New Jersey's tax system. Each tax has a different base and rate. Table 3-3 outlines the most significant taxes.

3.1.3 Historic Flooding and Past Studies

FEMA has developed floodplain mapping as part of the National Flood Insurance Program (NFIP) for the entire State. The New Jersey Department of Environmental Protection (DEP) utilized and expanded upon FEMA's studies to develop New Jersey State Flood Hazard Area Maps for the purpose of floodplain management. In Sections 4 through 12 of this report, the implications of historic flooding and past studies for each of the focus communities is detailed.

Table 3-3 New Jersey Tax Structure

Type	Base or Measure	Rate	Administering Agency
Corporate Business Tax	Net income allocated to New Jersey	7.5% for firms with under \$100,000 in net income; 9% for firms with greater than \$100,000 in net income	New Jersey Division of Taxation
Sales and Use Tax	Receipts from sales/use of taxable items	6%; 3% for certified businesses in Urban Enterprise Zones (UEZ)	New Jersey Division of Taxation
Gross Income Tax	Taxable income	1.4% to 6.37%	New Jersey Division of Taxation
Unemployment and Disability Insurance Program	Wages for workers; payroll for employers	Varies by program and by firm experience	New Jersey Division of Taxation
Local Property Tax	Valuation of property	Varies by municipality	Local Tax Assessor

3.2 Post-Disaster Conditions

3.2.1 PDA Data

A total of 76,338 residences, businesses, and government facilities suffered flood damages in the State of New Jersey as a result of Hurricane Floyd. Of this total, approximately 6,131 structures were destroyed or suffered major damages; 26,679 structures suffered minor flooding damages, and an additional 43,528 structures were affected.

The terms “destroyed,” “major damage,” “minor damage,” and “affected,” as they are used on PDAs and throughout this report are defined as follows:

Destroyed	Structure is a total loss or is damaged to the extent that it is not usable and not economically repairable.
Major Damage	Structure is damaged to the extent that it is no longer usable and may be returned to service only with extensive repairs.
Minor Damage	Structure is damaged and may be used under limited conditions; may be restored to service with minor repairs.
Affected	Some damage to structure and suspected damage to contents. Structure is usable without repairs.

The PDAs also distinguish between “businesses” and “industrial units;” however, this report makes no distinction between these terms and refers to any for-profit enterprise as a business, firm, or establishment.

In the State of New Jersey, at least 4,315 businesses were destroyed, damaged, or affected. Nearly one-quarter (1,087) of the destroyed, damaged, or affected businesses in the State were located in Morris County; however, only 166 of these businesses were damaged and none were destroyed. Essex and Bergen Counties reported 990 and 869 businesses impacted, respectively. In Passaic, Union, and Somerset Counties, a combined total of 1,167 businesses were impacted by the storm (430, 383, and 354 businesses in each county, respectively). Compared to other impacted counties, the magnitude of businesses affected or damaged in Middlesex and Hunterdon Counties was smaller (105 and 2 businesses, respectively). Estimates were unavailable for Mercer County.

As of November 1, 1999, 3,153 businesses had teleregistered with FEMA for financial assistance. A majority of business registrations were from Bergen County (1,050) and Somerset County (872). Passaic and Essex Counties had 498 and 303 business registrations, respectively. Union, Morris, Middlesex, Mercer, and Hunterdon Counties had a combined total registration of 430 businesses.

As of January 13, 2000, 367 businesses in New Jersey were approved for business physical disaster loans with the Small Business Administration (SBA). The total value of these loans was \$21.6 million. The SBA approved economic injury loans for 273 businesses for a total of \$6.6 million.

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Significant residential damage was also reported in the affected counties. At least 67,761 single-family homes and 4,708 apartment units were reported destroyed, damaged, or affected in New Jersey. Of these totals, 33,890 single-family homes and 2,125 apartment units were located in Essex County.

3.2.2 CEGC/Department of Treasury Telephone Survey Data

The CEGC/Department of Treasury telephone survey contacted businesses at random within the nine designated counties. (The six communities selected for this study and the City of Rahway were excluded from the survey.) The survey found that 20 percent of 672 surveyed businesses experienced flood-related damage and/or disruption to their business. However, only 13 percent of businesses were closed, even for part of a day. The mean time impacted businesses were closed was 1.7 days.

Forty-four percent of impacted businesses were in the services sector; retail trade and manufacturing accounted for 21 percent each. Sixty-seven percent of impacted firms had less than 50 employees. Ninety-three percent of impacted businesses were fully operational and only one firm was not operating at the time of the survey.

According to the survey, 48 percent of impacted businesses reported business disruption, primarily due to employees being unable to get to work or being under a “state of emergency.” Fifty-two percent of impacted businesses reported infrastructure problems (e.g., lack of telephone, electricity, or water). Although 75 percent of impacted businesses had some form of insurance, only 18 percent of insured businesses had flood insurance. Among the surveyed businesses, the total person-days lost as a result of Hurricane Floyd was 45,600, while the total estimated GSP lost due to flood-related business disruption was \$14 million.

It is important to note that the survey identified only 13 percent of businesses (excluding the six communities selected for this report and the City of Rahway) were damaged significantly enough to close and that a high percentage of these closings were for very brief periods, often just a few hours. This indicates that the reconnaissance team accurately selected communities receiving most of the damage in the State for further study as part of this report.

3.3 Conclusions

3.3.1 Impacts to Primary Industries and Employment

During the three years prior to Hurricane Floyd, unemployment had remained low and overall economic indicators had remained strong in New Jersey. In addition, no single sector was disproportionately affected by the September 16, 1999 flooding that accompanied Hurricane Floyd. This event, therefore, is not likely to substantially alter the previous industrial sector trends or have a significant long-term effect on the statewide economy.

At the community level, estimates of business and residential damage indicated significant variation in the type and extent of damage in each community and the variation in economic factors from community to community. According to the surveys, the retail and service sector reported significant damage in the Somerset County Boroughs of Bound Brook and Manville. Lower levels of small business losses were also reported in Bergen and Essex Counties and minimal effects on retail were found in Hunterdon and Morris Counties. Damage to manufacturing firms was evident in the Cities of Passaic and Paterson, in Passaic County, and the City of Trenton in Mercer County. Many undamaged businesses were forced to close down or lost inventory due to power outages and other infrastructure disruptions.

As described in the CEGC/New Jersey Department of Treasury report, only 18 percent of impacted businesses with insurance had flood insurance. Every day that these firms remained closed they lost revenue and became more likely to fail in the long-term. The following situations were common to many businesses:

- ▢ Many business owners were unaware that their business was located in a floodplain and were unfamiliar with the FIRMs for their area.
- ▢ While some business owners affected by Hurricane Floyd did have flood insurance, many had policies that were inadequate to cover the cost of repairs and losses.
- ▢ Although flood insurance on structural damage was common, flood insurance on equipment and inventory, and business disruption insurance was rare.
- ▢ Many business owners were misinformed about the cost, availability, and coverage of flood insurance.
- ▢ In other cases, business owners were forced to wait for long periods of time before receiving news on their insurance claims and were therefore unable to make the necessary repairs to reopen.

The flood also posed unique challenges for business owners who rent their premises. Business owners who rented their property were often left without assistance when they discovered their landlord did not have structural flood insurance. Alternatively, business tenants often did not have flood insurance to cover equipment and inventory even though their landlords did have flood insurance that covered structural flood damage. This discrepancy existed because the business tenants were often unaware that their business location was within a floodplain. At the same time the tenants were struggling with cleanup and repairs, they also had to continue to pay rent to landlords who themselves were financially saddled with the cost of repairs. Additionally, business owners who rent their property were often precluded from taking mitigation action to protect the structure.

Significant economic impacts in each community could extend to the county level and, to some extent, the State level. The effects of the disaster on each community should be reviewed, considering its individual needs, assessments, and plans for rebuilding and growth. Addressing the economic recovery needs of nine counties with different industrial compositions will require a combination of Federal and State relief programs to complement private investment. Communities and businesses should review the array of Federal, State, and local assistance programs listed in Appendix A of this report and seek appropriate financial and technical support to prepare economic recovery plans and implement strategies.

In the short-term, the State will likely experience a marginal shift in revenue and employment, as a percentage of GSP, from retail, service, and manufacturing to construction and wholesale trade. Table 3-4 describes the impacts identified or anticipated by each business sector. Although businesses in the manufacturing sector likely made up a smaller percent of damaged businesses compared to retail trade and service, the prevalence of “just-in-time” (JIT) manufacturing makes impacts to this sector even more severe. Manufacturing plants that rely on JIT principles or provide products to other firms that use JIT principles, were likely unable to deliver their product on schedule, thereby hampering their ability to compete locally, nationally, or globally as the case may be. However, as most structures are repaired and replaced and inventories are restocked, the contribution of various industries to revenue and employment probably will return to pre-disaster levels.

Table 3-4 Statewide Impacts by Sector

Sector	Impacts
Retail and Wholesale Trade	Businesses temporarily lost their customer base, as well as a significant amount of their equipment and inventory.* Owners of small businesses (primarily retail) will have difficulty in overcoming the economic effects of the flooding. Many small businesses were uninsured or lacked sufficient coverage. In some cases, the damage wiped out owner's savings and years of building the business. The fragility of these small businesses makes it unclear in the long run as to how many will be able to start over and return to pre-disaster levels or even remain in business. Wholesale trade will likely fare better than retail trade, since wholesalers unaffected by the flood could experience short-term increases in business to replace lost inventory of retail trade establishments. In the short term, State revenue and employment may have been negatively affected by retail losses in flooded areas.
Government	Primarily disaster-related expenditures and the loss of revenue, including short-term and possible long-term decreases in property taxes if the buildings are not rebuilt. If buildings are reconstructed, the long-term effect may be an increase in taxes. Unemployment payments will also increase and income tax collected will decrease. As of October 18, 1999, damage to public property and infrastructure caused by Hurricane Floyd in New Jersey was estimated at more than \$73 million. Many municipalities ran emergency relief efforts around the clock for several days at considerable expense to these communities.**
Manufacturing	Several manufacturing firms in Passaic and Mercer Counties sustained significant losses in equipment and inventory. Some uninsured losses were suffered from the loss of building contents and inventory, and to a lesser degree, from structural damage. Several firms lost specialized equipment (custom-made to the firm's production needs), which is particularly expensive and may require a longer replacement period. Many companies lost business to competitors. In addition to competitors benefiting from the disaster, manufacturers unaffected by the flood could experience short-term increases in business to replace lost inventory of retail trade establishments.
Construction	There will be some short-term increase in construction as a result of increased demand for renovation, rehabilitation, and new building to repair and replace flood-damaged properties. The impact in this sector will be mixed as some lesser-capitalized businesses decide not to reopen.
Service	Businesses have temporarily lost their customer base and business to competitors from outside the community.* Significant expenses are anticipated to replace nonstructural equipment and inventory losses. Large amounts of these losses were uninsured. In the short term, State revenue and employment may have been negatively affected as a result of service sector losses in flooded areas.
Agricultural	Agricultural losses were negligible due to the highly developed nature of the area and lack of farms. With the exception of a few crops, rains associated with Hurricane Floyd were beneficial after a summer drought.

* In communities where residential acquisition occurs, some businesses may lose significant portions of their clientele.

** FEMA's PA Program will reimburse municipalities for 75 percent of most costs to repair and replace public property and infrastructure, and to conduct emergency relief activities. The State of New Jersey will provide assistance for the remaining 25 percent of eligible expenditures and losses.

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Statewide, significant dislocation occurred during the 2 days following the flooding. Businesses surveyed reported estimated losses of approximately \$61.9 million as a result of the flooding. Compared to a statewide payroll of more than \$100 billion, effects of long-term dislocation at the State level are expected to be minimal. Long-term indirect effects, which were not forecast by this type of reconnaissance effort, may also still occur.

At the community level, the City of Passaic, Manville Borough, and Bound Brook Borough experienced significant employee dislocation as a result of the flooding. In the short-term, the State can expect higher numbers of unemployment claims in these communities, with many of those qualifying for disaster unemployment insurance. However, in the long-term, the increased construction and cleanup activity may offset some of these losses.

3.3.2 Impacts to Tax Base

Despite the severity of the disaster and the large number of businesses and homes destroyed or damaged, the overall impact to the tax base at the State level is anticipated to be minimal, primarily due to the magnitude of the total State economy. An estimated 1,353 businesses were destroyed or suffered major damage and 1,063 received minor damage. Combined, these figures represent little more than 1 percent of the more than 200,000 establishments in the State. Nonetheless, there will be some localized economic impacts due to the loss of revenues and taxes.

The primary impact to the State will be decreases in property, sales, and income taxes. At this time, it is difficult to quantify the degree of loss due to a lack of detailed information. While the decrease in tax revenues will almost certainly run into the millions of dollars, the severity and duration of the decrease cannot yet be determined. Past experience has shown that some impacts are not identified or felt until several years after a disaster.

As rebuilding proceeds, the State will see an increase in property and sales taxes. It is expected that the average value of the new structures built to replace damaged or destroyed older structures will be higher, which will eventually translate into higher property assessments and property taxes. Supplies and materials sold for construction will also be taxed. The unknown factors that remain are the length of time it will

take to rebuild structures, restart businesses, and realize higher tax revenues to replace the losses.

Although the overall impact to the State's tax base is expected to be minimal, the State will expend millions of dollars for disaster response and recovery. NJOEM estimates that its emergency operations expenditures, including fire suppression and rescue, law enforcement, access control, emergency medical services, debris management, personnel activation, and National Guard mission, have already reached approximately \$10 million. In addition, on October 25, 1999, Governor Whitman signed the Emergency Disaster Relief Act of 1999, which appropriated \$80 million in State funds for disaster relief funds for victims of Hurricane Floyd and the drought of 1999.

3.4 Recommendations

This section of the report includes a series of recommendations focused on the following issues:

- Mitigation planning strategies;
- Specific mitigation and recovery measures; and
- Federal, State, and local agency support, assistance, and coordination.

3.4.1 Mitigation Planning Strategies

Communities should consider disaster recovery as an opportunity to make proactive decisions that have long-term consequences and can enhance the ability of the local economy to protect itself against damage and disruption from future disaster events. Disaster mitigation professionals can provide informational material and technical assistance to encourage disaster-impacted businesses and communities to explore ways to make the local economy more sustainable and disaster resistant. Following are four recommendations to incorporate in the process of making these decisions:

a. Initiate a long-term economic recovery planning process.

Beyond issues of immediate cleanup and repairs, many flood-damaged communities are concerned about the long-term viability of their business sector. The State of New Jersey should use the Strategic Economic Development Plan to set priorities for both short- and long-term recovery efforts.

As part of this process, for those communities that experienced substantial damage, in particular industry-specific economic dislocations (such as fabric dyeing and printing in the City of Passaic), State and local agencies should work with industry associations and business leaders to design a sector strategy for economic recovery that

is consistent with the Strategic Economic Development Plan. Such a strategy might address issues of marketing, modernization, skill development, and access to capital.

Where appropriate, efforts to diversify local economies should be continued and integrated into ongoing strategic planning for economic development. For example, supporting replacement business formation through the development of small business incubator facilities and offering tax incentives for target sectors are measures that can help reduce the vulnerability of the local economy to disruption if the operations of a few large employers or specific employment sectors that dominate the local economy are impacted.

b. Integrate mitigation concepts within the economic recovery planning process. When local facilities and neighborhoods are damaged or destroyed, an opportunity becomes available to rebuild the area using more efficient, desirable, and sustainable development practices. It is critical for the State of New Jersey and local communities to connect their recovery operations with disaster mitigation concepts, help businesses recover, and encourage new business development in ways that make them more disaster resistant and less vulnerable to real property damage. Because of the short window of opportunity following a disaster, these actions must be taken as soon as the disaster recovery effort begins.

The process of developing a long-term economic recovery plan should provide the information for businesses to use in considering economic cost and benefits of incorporating disaster-resistant construction practices. The intent is to encourage businesses to change current practices and introduce more disaster-resistant methods of construction in rebuilding. For example, understanding the risks associated with the use of different construction techniques should be a high priority for businesses rebuilding after a disaster in order to “floodproof” the business community against future disasters.

Disaster-resistant development and redevelopment takes place once a community recognizes the flood risk and incorporates it into strategic plans for development and redevelopment. Disaster-resistant strategies include: gradual abandonment of floodplain areas through constraints on new development; acquisition and relocation of existing development; structure elevation; floodplain storage preservation; and early flood warning and education. It consists of multi-objective planning by incorporating vacated floodprone land into an open space/recreational plan.

Such tactics are most effective if they are developed as part of a cooperatively prioritized, strategic long-term economic recovery plan. For example, State and local governments should assess the consequences for the long-term viability of local business communities when considering acquisition of floodprone residential structures. Although businesses may recover in the short term, a loss of customer base might eventually lead to closure. If flood mitigation goals are served in the short term at the cost of business viability in the long run, the solution is less than optimal.

The business community must respond quickly to damage incurred because of a disaster. In many cases, businesses that suffered major

damage but were not destroyed cannot afford to wait for Federal input or assistance before committing their resources to repairing or rebuilding. At the same time the community is solving its current problems, there is also a need to develop mitigation strategies before the next disaster. The availability of resources, information, and mitigation strategies at the time they are most needed (e.g., immediately after the event) is critical to their successful implementation.

Therefore, communities should have pre-planned multi-hazard mitigation strategies so they can be quickly implemented in the event of a disaster. As part of its long-term recovery planning activities, the State of New Jersey should consider the designation of Project Impact community status for affected municipalities. The intent is to take full advantage of the current momentum and provide a mechanism for future action that is designed to provide for more disaster-resistant communities.

c. Integrate local businesses into the recovery process.

State and local government need to recognize the business community's importance in minimizing the adverse effects from disasters and accelerating economic stability. The following strategies can be used to help businesses participate in the recovery process, and therefore, help the entire community:

Search for businesses receiving damage. One lesson learned in preparing this report was that finding businesses that received damages and assessing their losses is a difficult and time-consuming task best done at the local level. When trying to assess the impacts of a disaster to the regional economy, two problems became apparent. First, individual communities lacked the mechanisms and/or resources to collect information on business damages and potential impacts to commerce, employment, and tax revenues. Second, communities that received the most media attention became targets for economic assessment because they had highly visible residential and commercial damages. These communities were often targeted at the expense of other communities that received substantial damages in less visible, but still important areas. Industrial areas, for example, are potentially damaged commercial sectors that do not have a high public profile but contribute significantly to the region's economy.

Each community's EMC or local Business Recovery Coordinator, if established, should contact businesses to document damages and impacts on revenue generation, job losses, and future viability. This information can be initially documented in PDAs and conveyed to county EMCs, NJOEM, and FEMA. However, follow-up coordination is critical in tracking the post-disaster situation as business owners update their assessments with more accurate information.

Communities should require local businesses to participate in economic recovery planning efforts and contingency plans. Local governments should incorporate local businesses in their economic recovery planning activities by including representatives of the local business community in the planning process. A team of local government and business leaders can jointly identify resources available to strengthen the capabilities of the community to do short- and long-term strategic recovery planning. Each community should maximize the available resources through community-based, grassroots organizations. Locally-based organizations can collect necessary

information on the disaster quicker than outside agencies, which must first determine the players and then establish contact. In addition, these organizations can provide practical support to businesses and communities in preparing grant applications.

Involve minority groups. It is important to identify and protect disadvantaged immigrant communities and other vulnerable ethnic groups that are often hardest hit by disasters. The State must reach out to these groups and develop innovative ways to disseminate information and expertise to them.

- d. Use today's economic recovery lessons to work smarter in the future.** After economic recovery activity has abated, communities should conduct an after-action assessment of which activities went well, which ones did not, and what can be done to be better prepared for the next flood. The lessons learned should be incorporated into a contingency operating plan to enable local government and businesses to work smarter, not harder, for the next recovery effort. For example, if a community successfully developed a plan to resolve traffic congestion issues, which were limiting access to businesses as they reopened, the plan can become a template to manage this activity in future disasters.*

3.4.2 Specific Mitigation and Recovery Measures

The preceding section outlined important elements of an economic recovery plan focused on rebuilding the community in a sensible and sustainable manner. The following three recommendations are intended to identify specific mitigation and recovery actions that should be considered for incorporation into individual community mitigation and recovery plans. These proposed actions are based on an understanding of what has been successful for other communities under similar situations and should help guide short- and long-term recovery decision making by the State and local communities. The common theme running through this discussion is the objective of attaining a balance between creating effective disaster mitigation and accelerating business recovery activities.

a. Implement appropriate physical mitigation measures.

This section includes a wide variety of recommended mitigation measures. Because appropriate mitigation measures depend on the particular situation, in all cases it is essential that business owners considering physical mitigation for their structures consult with the local floodplain administrator. The administrator can not only inform the owner of applicable floodplain management requirements, but may be able to provide additional technical information to assist in identifying and carrying out appropriate modifications.

* Individual businesses should consider preparing emergency response and recovery plans; FEMA's Emergency Management Guide for Business and Industry is an excellent resource towards this goal.

Businesses housed in large, structurally sound buildings that are able to withstand hydrostatic pressures associated with anticipated flood depths and velocities may be protected by methods that waterproof building exteriors and provide flood shields or barriers at building openings. Mitigation measures of this type can range from encouraging businesses to elevate whole structures and/or substantial business assets (e.g., furnaces and electrical boxes) above flood elevations to promoting thoughtful business practices such as simply selecting safe locations for storing business records.

Smaller commercial buildings may be effectively elevated above recurring flood elevations. Business and property owners are often unaware of small improvements which can be made to their structures that provide large hazard mitigation returns. Those that would like to take such precautions often do not because of the expense. State and local authorities should work with businesses in floodprone areas to assist them in identifying financial assistance to undertake floodproofing measures. Federal, State, and/or local tax credits, low-interest loans, or grants should be made available to offset the cost associated with approved floodproofing measures.

For situations where buildings and businesses must remain in susceptible floodplain areas, an integral component of a nonstructural flood damage mitigation strategy is an early flood warning system. Early communication with susceptible business owners concerning an impending flood threat is a key component to flood damage mitigation. Adequate time is required to secure inventory and business records, shut down utilities to avoid unnecessary damages, and avoid dangerous conditions for business owners and employees.

An early flood warning system is ineffective unless it is accompanied by an education program that informs business owners and employees of the degree of the potential flood threat and procedures to be used to provide warnings and disseminate information as well as prompts action to protect buildings, equipment, and inventory.

If in-place protection is not practical, it may make sense to acquire sites that suffer from recurring floods, relocate businesses to areas outside of the floodplain and remove threatened structures.

Structures located in the most hazardous flood zones, especially structures that have been repetitively damaged, should be given first priority for acquisition programs that can also yield multiple benefits to the community. For example, State, county, and local governments can integrate the acquisition of floodprone properties and the demolition of threatened structures with the creation of recreational amenities and/or restored natural resources.

At the same time, relocation plans must reflect the needs of relocated businesses. Since communities hope to avoid losing businesses and associated employment opportunities, an adequate supply of viable commercial properties and nearby housing for workers and consumers must exist in safe locations.

Where nonstructural flood protection measures may not be practical or feasible, structural flood control measures including floodwalls, levees, channel improvements, or upstream stormwater detention may be warranted. Structural flood control measures are

designed to contain the flood threat to areas free of vulnerable development. While such measures can be largely effective in mitigating flood damages, a residual flood risk remains due to the threat of storms that may exceed the design levels to which projects are constructed. Structural flood control projects are considered most often where physical and financial constraints prevent the implementation of nonstructural means of flood protection. This commonly occurs in urbanized or semi-urbanized areas where it can be impractical to relocate, elevate, or protect the building stock.

Relocate critical facilities outside the floodplain or, where this is not feasible, ensure critical facilities are protected from flooding through approved structural measures. Critical facilities are vital to providing community services and include: hospitals; major roadways; water supply and waste treatment plants; police and fire stations; electrical generation facilities; emergency operations and response centers; and emergency shelters and evacuation routes. Local jurisdictions should relocate, repair, and/or replace public infrastructure essential to business operations in a manner that is both sustainable and flood resistant.

Relocate and prohibit unsafe land-use activities from high hazard floodplains to reduce pollution of floodwaters by hazardous materials. Unsafe land uses include structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials that can cause great environmental damage. At the same time, government agencies should review zoning ordinances, building codes and enforcement mechanisms to ensure they are up to date and serve to rebuild a stronger and more disaster-resistant community. In many cases, future losses can be significantly reduced by simply applying existing codes and ordinances.

Anticipate future disaster recovery needs. As part of the strategy of anticipating future disaster events, the community can look to integrate strategic temporary relocations into mitigation planning. The site of temporary relocation for displaced residents should occur as close as possible to business districts, and such sites should be specified in the community's mitigation plans. In response to the Upper Midwest Floods of 1997, the City of Grand Forks, North Dakota built temporary business and residential facilities at a city-owned industrial park to provide commercial/industrial space for displaced businesses and homes for displaced residents. Since residents often are the primary customer-base for a community's retail and service businesses, the temporary relocation of displaced residents and businesses should be coordinated to maximize opportunities for economic recovery.

- b. Increase flood risk awareness and facilitate purchase of sufficient flood insurance.** After physical mitigation measures to prevent damage, flood insurance is the most important line of defense for businesses. However, as described in the CEGC/New Jersey Department of Treasury report, only 18 percent of impacted businesses with insurance had flood insurance. Sustainability is more likely to be reached with an aggressive approach to achieving greater participation.

Programs exist to enable business owners to purchase flood insurance coverage for financial protection of buildings and contents damaged by

floods, mudslides, or flood-related erosion. Therefore, the following ideas and recommended actions should be considered with regard to flood insurance for businesses:

- ▢ Local governments should tie incentive programs for business recovery to securing and maintaining adequate flood insurance policies.
- ▢ Federal, State, and local agencies may be able to make funds available for businesses to borrow against expected flood insurance payments so that repairs can begin in a timely manner.
- ▢ Local governments should make FIRMs more conveniently available to the general public. Advertising and making FIRMs available to businesses would help communicate flood risks to community members and enhance awareness. Planning grants exist for states and communities to use in assessing flood risk and identifying vulnerable areas.
- ▢ The State and municipalities should create a program to inform business owners about the cost and availability of flood insurance. Affected municipalities should request that FEMA, in concert with local private sector insurers, arrange to present a series of symposia on the need for flood insurance coverage and its benefits to businesses and the community at large.

In addition, the following recommendations are specifically designed to provide business tenants with more information and time to plan for economic recovery.

- ▢ Tenant notification of floodplain status should be required in every commercial or industrial lease.
- ▢ Municipalities should more strictly enforce time limits for property managers to repair infrastructure and re-establish utilities in flood-damaged properties.
- ▢ Municipalities could create hotlines or websites for business tenants to access information regarding rights of tenants and responsibilities of landlords, and to report landlords for violations of those rights or abrogation of those responsibilities.

c. Facilitate Business Recovery. The following examples are specific steps that can be taken to facilitate business recovery:

Local governments should streamline and shorten the time it takes to make zoning, variance, and building permit decisions. In the recovery effort, an increased workload can overwhelm the zoning and building permit offices. Many businesses will rebuild their structures just as they were prior to the flood. However, others will use the opportunity to expand, refurbish, and extend their business to accommodate their current needs. This requires zoning and building permit offices to respond to the increased application load on a timely basis. The municipality can expedite the process by providing assistance in identifying the types of information, forms, and drawings that must be presented. The recovery phase effort is also an opportunity to incorporate floodproofing and other hazard mitigation measures into reconstruction. The community can also schedule additional public hearings and hire temporary building permit

reviewers to handle the increased caseload. The State should consider providing technical expertise to communities to meet the increased demands of zoning variances and building permits.

Communities should help market and promote local economic recovery efforts. Consumers are often unaware that businesses are operational after a disaster. As businesses recover and local governments take economic recovery actions, there is a benefit in celebrating success, improving communications, and effectively conveying a positive message of hope and progress. Through publicizing recovery, residents and consumers are aware of when and where businesses are reopened and they become involved in the public process of recovery. A Business Recovery Coordinator can serve as a key point of contact for coordinating development of this critical message. As an example, one business that floods frequently placed an advertisement in a local newspaper publicizing that it was open. Another business in the same strip mall noticed a decrease in revenue following the flood because its clientele assumed they were closed. Perhaps businesses in the strip mall could pool their resources to advertise that they are open; this effort could be organized by the Business Recovery Coordinator. Other channels for marketing and promoting local economic recovery efforts, such as television or cable, should be explored. Universities and local community colleges may provide a good partnership for development of a website for such efforts.

Communities should encourage corporate disaster relief efforts through advertising. Soon after the flooding from Hurricane Floyd subsided, a multinational corporation ran a series of advertisements on national television describing the type of disaster relief assistance it provided. Since being a good corporate citizen has become increasingly important to companies, damaged businesses may have an opportunity to work with vendors to delay payments or provide equipment or inventory at or below cost. In return, businesses recovering from disaster damages can offer free advertising to the vendors, for example on takeout menus or on shop windows, highlighting the vendors' contributions to disaster relief. The Business Recovery Coordinator should organize these efforts and facilitate advertising on a larger scale, for example, by obtaining free advertising in a local newspaper or producing and posting flyers throughout business districts.

Communities should consider giving purchasing preference to local businesses. Economic development in communities can be thought of as a system in which money flows into the community, circulates within the community, and flows out of the community. One goal of the business and political leadership is to maximize the flow of money into the community and its circulation within the community. Dollars impact a community to the extent they remain in the community. For example, if a network of business owners decides to purchase its stationery supplies from the local stationery store rather than from a national chain 20 miles away, those dollars stay in the community. If the stationery store owner reciprocates and buys his/her goods and services locally, those dollars have a secondary positive impact on the community. The more times those dollars are spent in the community, the more benefit the community receives.

A local municipality's purchasing decisions can have a major impact on these dollar flows. When the community gives purchasing preference to local businesses it maximizes the circulation of local tax dollars inside the community. That effect is amplified when the business community develops a buying and selling network that gives preference to local businesses.

The importance of municipalities giving purchasing preference must be balanced against the municipality's responsibility to acquire the highest quality goods/services at the best possible prices. Clearly, all legal and regulatory statutes regarding procurement must be followed. However, when local businesses are not accustomed to working with a government entity, they may not compete for the municipality's business even though they can provide high quality goods and services. In addition, many smaller purchases do not require open bidding. Those smaller purchases can make a difference when they go to local businesses rather than to outside firms.

Communities should actively develop a program to provide parking to the patrons of local businesses. The availability of free (or low cost), safe parking with easy access to the shopping district is a key factor to economic development success. Too often, municipalities see parking as a profit center that generates money through meter revenue and fines. Those same municipalities do not evaluate expensive or inconvenient (30-minute maximum) parking as a cost factor that drives customers and, hence, business away from the community, thus hindering economic development. The cost/benefit of fee-based parking as opposed to free or low-cost parking is an important matter for discussion among local leadership. Properties acquired in the floodplain and then demolished should be considered for parking, especially if permeable surfaces are used. This will help older business districts, such as Bound Brook, compete with suburban shopping malls.

3.4.3 Federal, State, and Local Agency Support, Assistance, and Coordination

Communities must face decisions that have short- and long-term consequences in terms of the survivability of impacted businesses. While some resources are available to assist local communities in setting critical priorities for recovery, resources to implement local action plans are more limited. The following identifies, in general terms, important support and interactions that need to occur.

a. Support mitigation planning and implementation efforts.

Federal and State agencies have extensive resources to assist local communities in the development and implementation of long-range mitigation and recovery plans. Communities and businesses should review the array of Federal, State, and local assistance programs listed in Appendix A and seek assistance wherever possible.

Local, State and Federal planning agencies can provide technical support to ensure replacement development is compatible with local development goals and objectives. It is the State's

responsibility to provide assistance to and work with smaller communities to determine the best strategies for individual communities. In addition, FEMA maintains a cadre of disaster mitigation professional staff that may be available to provide technical assistance services. Using this report as a foundation, FEMA could provide technical assistance on long-term economic recovery planning for communities.

FEMA and EDA have also developed training focusing on economic development and mitigation planning. This course can be delivered to all planners from communities affected by Hurricane Floyd. Prioritizing projects and properties to be addressed can be determined through a cooperative effort between the community, NJOEM, and FEMA. FEMA can help identify communities and structures that should be considered as principal “targets” for mitigation, e.g., through elevation, floodproofing, acquisition, or relocation. FEMA, in conjunction with the DEP, has prepared a list of structures in New Jersey that have suffered repetitive flood losses. The State and municipalities should use this list to prioritize structures to be elevated, relocated, or acquired. In addition, the State should continue to pursue EDA funding for establishing a long-range planning process to provide the necessary detailed approach that fits the needs of the local communities and the broad interests of the State.

Federal mitigation money made available as a result of this disaster should be utilized to implement strategies identified in the State’s Mitigation Plan. For example, EDA has suggested that the State apply for funds to hire Hazard Mitigation Program Specialists to work with and in local communities. In addition, EDA has asked that the NJOEM submit a proposal for funds to update the State’s emergency mitigation plan.

It is critical that local communities are aware of and actively involved in any reassessment and/or implementation of the State’s Mitigation Plan. Coordination of local and State plans in this manner will help eliminate duplication of effort and maximize the use of resources.

Implementation Assistance. Communities will need financial and technical assistance to help implement locally prioritized, strategic long-term economic recovery plans. Funding mechanisms are available for mitigation activities such as buyouts and relocation.

In addition, FEMA can provide technical assistance (see Appendix B) and information about building practices to businesses and homeowners who are rebuilding to ensure that the most suitable building methods are employed. For example, FEMA could coordinate and conduct a forum featuring representatives from the American Institute of Architects and National Association of Homebuilders to demonstrate new technologies, building materials, and mitigation construction techniques. Communities can then rebuild more safely and capture opportunities to develop examples of mitigation contingency planning based on successful economic recovery experiences related to this disaster.

Public Education. As another method of providing technical assistance on mitigation, FEMA and NJOEM should consider presenting a series of workshops and town meetings to educate business owners and municipalities on steps they can implement to

mitigate against future flood damage. Workshops should focus on common sense approaches to mitigation recovery and deal with subjects such as raising circuit panels well above the base flood elevation, keeping records in floodproof areas, and purchasing adequate flood insurance. Topics should also include planning and recovery issues whereby business owners and local officials can share success stories and lessons learned. In addition, FEMA should conduct a workshop for business owners and municipalities addressing how historic preservation and the National Environmental Policy Act can be successfully incorporated into the recovery process. Communities would benefit from a well-organized presentation focusing on the NFIP/ Flood Insurance Administration (FIA) and the role of flood insurance in rebuilding and maintaining a sustainable community. Such a presentation could be the basis for a forum with local business owners exchanging ideas to increase participation rates in the NFIP.

b. Provide financial incentives. Local, State and Federal agencies can take several steps to assist businesses by providing grants, low-interest loans, and other financial incentives. The precise form of local business assistance depends on the extent of damage, the potential cost of relocation, and the probability of future damage caused by flooding or other hazards. For example, funding could be provided for local short-term “gap” financing for business recovery. Assistance is particularly necessary in identifying new opportunities and investments. Some businesses will fail while waiting to reopen due to the lack of available operating space, unavailability of operating funds, or delay in the delivery or repair of specialized equipment. In addition, a number of businesses interviewed indicated that they have tried to keep their employees on the payroll or have transferred them to other facilities until they are able to rebuild or repair their businesses. Incentives or financial assistance for these businesses could make the difference between reopening or shutting their doors. The following specific recommendations are designed to ease business recovery in the wake of Hurricane Floyd flood damage:

- Local governments should consider postponement or forgiveness of a portion of property tax payments for flood-affected businesses that commit to rebuild within the community.
- On October 18, 1999, Governor Whitman, State Senate President Donald DiFrancesco, and State Assembly Speaker Jack Collins announced support for legislation granting sales tax exemptions to victims of Hurricane Floyd. The State should consider implementing a similar exemption for businesses that were damaged by the storm. Suspension or deferment of sales tax on replacement equipment, new inventory, and materials and supplies needed to repair flood damages would enhance businesses' financial ability to recover from disaster damages. In addition, municipalities affected by disasters should consider petitioning the State for temporary or partial sales tax relief on behalf of local businesses to spur local economic recovery.
- State Investment Tax Credits or Manufacturer's Limited Exempt Certificates are tools that should be considered to encourage businesses to rebuild in the same location or remain in the same community.

- Local governments, in conjunction with State and Federal agencies, should offer relocation assistance to businesses located in areas of repeated flooding. Such assistance should include site selection, grants or loans for moving expenses, and structural enhancements.
- Local officials should conduct a forum with local mortgage bankers and lending institutions with the purpose of encouraging low interest loans and deferred payment schedules to stimulate economic recovery. For example, lenders could provide financing to develop a local public/private infrastructure lending program.
- The State should consider a CEGC/Department of Treasury recommendation that the New Jersey Commerce Commission request \$20 million to implement a low-interest, long-term loan program for companies that suffered damages and were not covered by business interruption insurance or for “acts of God,” or did not have insurance covering the value of labor and documents other than work products. In extreme circumstances, the New Jersey Commerce Commission should be given the discretion to convert these loans into recoverable grants that will be repaid only if the company’s survival is not placed in jeopardy by a repayment request. These funds can also assist with any other unforeseen circumstances.
- EDA should reduce or waive matching funds requirements consistent with existing statutes and regulations for affected community economic adjustment grants employing mitigation techniques.

c. Establish a focal point for economic recovery in local government.

Local government can be more responsive in making critical decisions on economic recovery. A single point of contact, such as a “Business Recovery Coordinator,” should be established to help the community and its businesses to:

- Address critical short-term economic recovery issues more efficiently;
- Coordinate business recovery efforts with emergency management operations more effectively;
- Coordinate strategic long-term economic recovery planning more effectively; and
- Connect business owners with the resources they need in the most efficient manner.

County economic development authorities or the New Jersey Economic Development Authority (NJEDA) should have economic development staff who are familiar with the economic climate and businesses in their areas and should be capable of providing technical assistance to local governments and businesses.

d. Develop and strengthen post-disaster recovery

partnerships. Efforts should be focused on establishing permanent communication channels between State and local economic development agencies and emergency management agencies, as well as

facilitating the development of a network to integrate the business, residential, and political elements of the community.

Communication between the local business and political community should be developed and strengthened. During site visits to affected communities, a wide difference was noted in the relationship between local government leaders and the business community. Some communities enjoyed the benefits of well-established communication channels that provide a free flow of ideas, information, and criticisms between the groups. Other communities did not. These less-connected communities faced the difficult task of developing communication channels following the disaster. Communities should create and maintain a set of well-defined communication channels with the business community. It is best if these channels are exercised on a regular basis so that business owners and political leaders will be comfortable using them when a disaster occurs. Affected municipalities have a unique opportunity to capitalize on the momentum and resources that have come together in the post-disaster environment to build back more resistant to future disasters and provide comprehensive incentives for restoring and retaining business activities.

Create a website that acts as a network to integrate the business, residential, and political elements of the community. Communities are advised to focus attention on two aspects of local economic development: networking local businesses and providing the community with information and capability to place orders with local businesses. One goal of the community Internet site should be to develop a buying/selling network of local business owners that maximizes the circulation of dollars within the community. That network is even more effective when tied into the buying decisions of the municipal government.

Another use of the web is to link the local business to the community. For example, the local deli can post its daily specials on the website. A customer can order over the web and indicate the time and place the order should be delivered or picked up. This simple example is an indicator of how the web can be used to link residents to the business community.

Two questions arise when discussing the use of the Internet as an integral part of a public communication process.

1.) How can a local government with limited resources develop such a website, especially when many government employees are not familiar with the new technology? and 2.) How can people without means access the Internet?

The first issue can be approached by challenging the Boy Scouts or Girl Scouts, other organizations, or a community college class to a website design competition. The creativity and skills young people have developed around this technology represent an amazing tool that can and should be utilized. The second issue is addressed through public forums such as libraries and schools which often provide free access. Additional access could be solicited from area businesses as part of a contribution to the recovery effort.

Communication between the economic development agencies and emergency management agencies should be formalized. An earlier

recommendation advocated the benefits of well-established communication channels between local government leaders and the business communities. Similar lines of communication should be forged and maintained between State and local officials from economic development agencies and emergency management agencies. Exercising these channels should provide NJOEM with more effective use of NJEDA's programs.

Compile a reliable PDA database and track impacts to businesses at the Federal and State levels. PDAs are the first pass at identifying damaged localities and quantifying damage, and, as such, they are often the best source of information available immediately after the event. This is also the time period during which it is critical to reach businesses damaged by the disaster. Completing reliable and accessible PDAs would assist the State and Federal governments in rapidly and accurately identifying areas requiring the most attention. A post-disaster review of how the PDA process was conducted could provide insight into how its accuracy, timeliness, and availability could be improved for future disasters. NJOEM should consider a post-disaster review of PDAs to assess procedural improvements and training programs for county and municipality EMCs.

Although finding businesses that received damages and assessing losses is best done at the local level, coordination of this information should occur at the State and Federal level. Federal and State governments are typically responsible for deciding upon total amounts and allocation of assistance funding. To better serve the business community, Federal and State agencies need to be aware of the extent and distribution of business-related damage. Currently, PDAs are the only tool for assessing damage to businesses and neither FEMA nor NJOEM compile data on damaged businesses separately from other privately-owned structures (e.g., residences). FEMA and NJOEM should consider assigning staff who would be responsible for tracking impacts to businesses and coordinating specific disaster relief efforts. The New Jersey Department of Commerce should consider designating an individual to assist in tracking these businesses and recommending and coordinating disaster relief strategies.

In Sections 4 through 12, specific pre- and post-disaster conditions and situation-specific recommendations are presented for the nine counties and six communities covered in this report. Although these recommendations were developed after studying the economic impacts to businesses resulting from Hurricane Floyd, many of these recommendations would help businesses in any community recover from and mitigate against other types of disasters.

On the facing page, a case study is introduced that demonstrates that implementing flood damage mitigation measures in advance of a disaster can reduce loss of life and damages to property.

CASE STUDY – CITY OF RAHWAY, NEW JERSEY

The City of Rahway is a community of 4 square miles in Union County. In 1990, it had a population of 25,325. Located along the Rahway River, the city is also traversed by Robinson's Branch, Orchard Creek, and the South Branch of the Rahway River. As a result of its location and low elevation, the city has suffered significant and repeated flood damage throughout its history, most notably May 1968, August 1971, August 1973, and July 1975. The City of Rahway has taken several steps to reduce its flood risk. It has created a comprehensive Floodplain Mitigation Plan and worked closely with the USACE on projects. These include: levees along the Rahway and the South Branch; movable flood gates at East Milton and East Hazelwood Avenues along the Rahway River; and a movable floodgate and interior drainage pump station near Main Street.



Project Impact

In 1999, the City of Rahway became a “Project Impact Community,” and dedicated itself to: reducing its vulnerability to disasters; identifying and prioritizing mitigation efforts for different types of hazards; examining potential mitigation options; recommending mitigation projects; and forming private/public partnerships to implement mitigation measures. Rahway is also coordinating flood damage mitigation measures for repetitively damaged homes; an inventory and pruning/removal program for shade trees in the city; analysis of interior drainage pump station operations on the existing flood control project constructed by USACE; and a restudy of the FIRMs. Also, under the NJOEM Flood Mitigation Assistance Program, Rahway has already executed an acquisition/removal program for several residential homes along Union and Allen Streets.

Hurricane Floyd

Hurricane Floyd caused severe flooding in Rahway and set a new peak record on September 16, 1999. The flood crest at the Rahway River at the Rahway gage reached a flood stage of 9.65 feet, 1.77 feet higher than the previously recorded peak. Further downstream at the Rahway River, Springfield gage, the event also established a new peak record with a recurrence frequency greater than a 100-year event. Robinson's Branch in Rahway also set a new peak record, measured to be almost 6 inches greater than the previous peak record and having a recurrence frequency of 58 years.

Although some business damage occurred in Rahway as a result of Floyd, city officials believe that the damage would have been worse if mitigation projects had not been undertaken. The mitigation efforts Rahway is undertaking include acquiring and demolishing structures along waterways as well as reconcentrating development within the town center to limit sprawl. In this way, Rahway is reducing its flood risk in a manner consistent with the objectives of the New Jersey State Plan.

Mitigation Projects - Open Space Acquisition

Mitigation projects (planned and completed) have taken advantage of a number of public-private partnerships including FEMA, USACE, corporations, utilities, and developers. The city is considering the use of “open-space” funds for the acquisition of properties along waterways, arguing that this would have the double benefit of reducing flood risk while increasing green acres within the city.

Union and Allen Streets

Union Street currently runs parallel to the Rahway River, just above where it curves to join the Robinson’s Branch River. The 14 residences on this street have been regularly inundated by floodwaters. City emergency workers often have to rescue local residents by boat - often at great danger to personal safety. In conjunction with FEMA’s Project Impact and with additional funding from Merck Corporation, the City of Rahway created a mitigation plan to turn the area into passive parkland.



Sudha Maheshwari, Rutgers University

The mitigation plan includes the removal of residential structures from Union Street (as well as the street itself), from Newton Street to the river bend. The plan also calls for wetland creation and passive park infrastructure. One resident at the corner of Allen and Union opted to stay and instead elevated his house.

By the time of Hurricane Floyd, 11 of 13 residences had been removed (the remaining two were unoccupied). The elevated house suffered only minor damage. If the residences had not been removed, the occupants almost certainly would have required rescue and the houses would have been significantly damaged.

Totten Street

A car dealership experienced significant flooding in this area due to the tidal nature of the Rahway River and the unimpeded flow of floodwaters across Routes 1&9. The dealership is across the highway from a waste-to-energy incinerator operated by Ogden-Martin for Union County Utilities. Working with Ogden-Martin and the utility, the City of Rahway undertook an 8-year project to install a tidal gate and pumping station. The pumping station and tidal gate worked well during Hurricane Floyd and the dealership was not affected by flooding.



Sudha Maheshwari, Rutgers University

Essex Street

One mitigation project in the planning stages is the conversion of a derelict commercial district on Essex Street into a park/townhouse development. This area is located along the Rahway River just above where it meets the South Branch. The City of Rahway is acquiring the 20 or so commercial properties and will demolish them to create a public park. The property slopes upward away from the river and a developer will build elevated townhouses on the higher ground. The area borders a viable salt marsh, which this plan is intended to protect while mitigating flooding.

